

## **REMARKS**

In response to the above-identified Office Action, Applicant traverses the Examiner's rejection of the claims and seeks reconsideration thereof. Claims 1-11 are now pending in the present application. In this response, Claims 1, 6 and 7 have been amended, Claims 8-11 have been added and no claims have been cancelled.

### **I. Amendments to the Claims**

Applicant respectfully submits herewith the attached Amendments to the Claims in which Claims 1, 6 and 7 have been amended pursuant to the Examiner's request for correction. Applicant further adds new independent Claim 8 and Claims 9-11 which depend from Claim 8. Claim 8 is directed to a method of forming quantum dots, comprising forming a lattice-matched buffer layer on an InP substrate, forming an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer on the lattice-matched buffer layer, and forming In(Ga)As quantum dots on the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer, wherein the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer changes the surface structure of the lattice-matched buffer layer and alters a strain energy that is necessary to grow the In(Ga)As quantum dots. Support for Claim 8 may be found, for example, on page 3, lines 14-22 of the application. Claim 9 recites the buffer layer is made of InAlAs, InAlGaAs, InP, InGaAsP or is a heterojunction layer of at least two of these four materials. Support for Claim 9 may be found, for example, on page 3, lines 15-16 of the application. Claim 10 recites wherein in the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer,  $x$  is in a range of 0.05 to 0.45. Support for Claim 10 may be found, for example, on page 3, lines 18-19 of the application. Claim 11 recites wherein the thickness of the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer is in a range of 0.5 nm to 10nm. Support for Claim 11 may be found, for example, on page 3, lines 19-20 of the application. Applicant respectfully submits the attached amendments do not add new matter and are supported by the

Specification. In view of the foregoing, Applicant respectfully requests entry of the attached Amendments to the Claims.

## **II. Claim Objections**

In the outstanding Office Action, the Examiner objects to Claims 1, 6 and 7 on the basis they contain several informalities that must be corrected. Accordingly, Applicant respectfully submits the attached Amendments to the Claims correcting the language of Claims 1, 6 and 7 as requested by the Examiner. In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the objection to Claims 1, 6 and 7.

## **III. Claim Rejections – 35 U.S.C. §103(a)**

In the outstanding Office Action, Claims 1-4 and 7 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mukai (U.S. Patent No. 6,815,242) ("Mukai"). Applicant respectfully disagrees for at least the following reasons.

To establish a *prima facie* case of obviousness, the Examiner must show that the cited reference teaches or suggests each of the elements of a claim. Hindsight reconstruction may not be used to modify the reference to meet the claimed invention. MPEP §2145. Furthermore, the fact that the claimed invention is within the capabilities of one of ordinary skill in the art, without some showing of an objective reason for modifying the reference to arrive at the claimed invention, is not sufficient to establish a *prima facie* case of obviousness. *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000).

The present invention is directed to a method of forming quantum dots, the method comprising an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer formed on a buffer layer and  $\text{In}(\text{Ga})\text{As}$  quantum dots formed on the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer.

In regard to independent Claim 1, Applicant respectfully submits Mukai fails to teach or suggest at least the element of an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer formed on a buffer layer. Mukai teaches a method of manufacturing a semiconductor device with quantum dots. The Examiner alleges Mukai teaches an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  layer (136) formed on a buffer layer (132/134)(col. 17, lines 15-55 and Fig. 19A-19C) and suggests that although Mukai fails to teach the use of a strained layer, this element would have been well known in the art. See Action, page 3. Applicant respectfully disagrees with the Examiner. Mukai teaches that “layer 136 is formed on the n-GaAs substrate 130”, not buffer layer (132/134) as suggested by the Examiner. See Mukai, col. 17, lines 28-32; Fig. 19A.

Moreover, the Examiner’s reliance on what was “known in the art” to teach an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer without supporting evidence is inappropriate. See In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420-421 (CCPA 1973)(noting it would not be appropriate for the Examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known). Mukai fails to even contemplate or discuss the use of a strained layer to achieve the desired results thus it is not instantly apparent that the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  layer formed on the n-GaAs substrate layer could be used as a strained layer. If the Examiner chooses to maintain this position, Applicant respectfully requests that the Examiner provide supporting documentary evidence showing the facts asserted are “well known.” Accordingly, the Examiner has failed to point to, and Applicant is unable to discern, a portion of Mukai teaching or suggesting at least the element of an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer formed on a buffer layer. The Examiner has further failed to show this element is “well known” thus a *prima facie* case

of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 1 under 35 U.S.C. §103(a).

In regard to Claims 2-4 and 7, these claims depend from Claim 1 and incorporate the limitations thereof. Thus for at least the reasons discussed above in regard to Claim 1, a *prima facie* case of obviousness has not been established with respect to Claims 2-4 and 7. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 2-4 and 7 under 35 U.S.C. §103(a).

In regard to Claims 8, Mukai fails to teach or suggest at least the elements of forming a lattice-matched buffer layer on an InP substrate, forming an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer on the lattice-matched buffer layer, wherein the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer changes the surface structure of the lattice-matched buffer layer and alters a strain energy that is necessary to grow the In(Ga)As quantum dots. As discussed above, the Examiner admits Mukai fails to teach a strained layer formed on a buffer layer. In addition, the Examiner has failed to point to a portion of Mukai teaching an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer on a buffer layer, much less a lattice-matched buffer layer, wherein the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer changes the surface structure of the lattice-matched buffer layer and alters a strain energy that is necessary to grow the In(Ga)As quantum dots as recited in Claim 8. Lastly, the Examiner has failed to provide sufficient support for the assertion that an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer was well-known in the art therefore the Examiner has further failed to show this element is obvious. Accordingly, Mukai fails to teach or suggest each and every element of Claim 8. For at least the foregoing reasons, Claim 8 is not *prima facie* obvious over Mukai.

In regard to Claims 9-11, Claims 9-11 depend from Claim 8 and incorporate the limitations thereof. Thus, for at least the reasons discussed above in regard to Claim 8, Claims 9-11 are not *prima facie* obvious in view of Mukai.

In the outstanding Office Action, Claims 5 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mukai in view of Petroff et al (U.S. Patent No. 5,614,435) ("Petroff"). Applicant respectfully disagrees for at least the following reasons.

Claims 5 and 6 depend from Claim 1 and incorporate the limitations thereof. Thus, for at least the reasons discussed above in regard to Claim 1, Mukai fails to teach or suggest at least the element of an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer formed on a buffer layer and the Examiner has failed to show such element is "well known." Moreover, the Examiner has not pointed to, and Applicant is unable to discern any portion of Petroff teaching this element. Thus, Claims 5 and 6 are not *prima facie* obvious over Mukai in view of Petroff. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 5 and 6 under 35 U.S.C. §103(a).

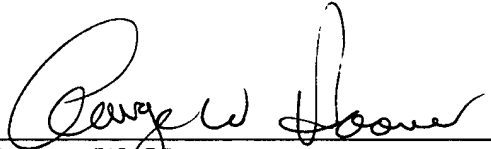
In regard to Claims 8-11, as previously discussed, Mukai fails to teach or suggest at least the elements of forming a lattice-matched buffer layer on an InP substrate, forming an  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer on the lattice-matched buffer layer, wherein the  $\text{In}_x\text{Ga}_{1-x}\text{As}$  strained layer changes the surface structure of the lattice-matched buffer layer and alters a strain energy that is necessary to grow the In(Ga)As quantum dots. Moreover, the Examiner has not pointed to, and Applicant is unable to discern any portion of Petroff teaching these elements. Thus, neither Mukai nor Petroff, alone or in combination teach each and every element of Claims 8-11. Since each and every element of the claims is not taught by the references, a *prima facie* case of obvious over Mukai in view of Petroff may not be established.

## CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely Claims 1- 11, are now in condition for allowance and such action is earnestly solicited at the earliest possible date. If there are any additional fees due in connection with the filing of this response, please charge those fees to our Deposit Account No. 02-2666. Questions regarding this matter should be directed to Eric S. Hyman, Esq. at (310) 207-3800.

Respectfully submitted,  
BLAKELY, SOKOLOFF, TAYLOR, & ZAFMAN LLP

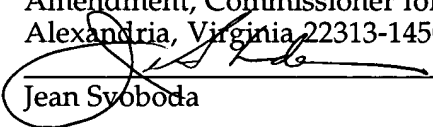
Dated: June 23, 2005

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I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on June 23, 2005.

  
Jean Svoboda